The digital divide: Patterns, policy and scenarios for connecting the 'final few' in rural communities across Great Britain

Lorna Philip [a, *], Caitlin Cottrill [a], John Farrington [a], Fiona Williams [b], Fiona Ashmore [a]

[a] Geography and Environment, School of Geosciences, University of Aberdeen, United Kingdom
[b] Geography and International Development, University of Chester, United Kingdom

A B S T R A C T

The Internet can bestow significant benefits upon those who use it. The *prima facie* case for an urban-rural digital divide is widely acknowledged, but detailed accounts of the spatial patterns of digital communications infrastructure are rarely reported. In this paper we present original analysis of data published by the UK telecommunications regulator, Ofcom, and identify and reflect on the entrenched nature of the urban-rural digital divide in Great Britain. Drawing upon illustrative case vignettes we demonstrate the implications of digital exclusion for personal and business lives in rural, and in particular remote rural, areas. The ability of the current UK policy context to effectively address the urban-rural digital divide is reviewed and scenarios for improving digital connectivity amongst the 'final few', including community-led broadband, satellite broadband and mobile broadband, are considered. A call is made for *digital future proofing* in telecommunications policy, without which the already faster urban areas will get 'faster, fastest' leaving rural areas behind and an increasingly entrenched urban-rural divide.

1. Introduction

For many it is difficult to imagine life without digital modes of communication. In the discourse that the Internet bestows significant benefit upon those who use it, global media assume that digital connectivity is ubiquitous and governments exhort citizens to interact with the state online. However, despite the digital society's apparent pervasiveness, not everyone is digitally connected: for example, in Britain in 2014, 16% of households, approximately 4 million, were not online (Office for National Statistics, 2014). In the Global North digital non-participation is, for some, a personal choice. Others may lack digital literacy skills or be unable to afford a digitally-enabled device and/or an Internet Service Provider (ISP) contract, reinforcing a close association between financial exclusion and social exclusion (Chen and Wellman, 2005; Fuentes-Bautista and Inagaki, 2012; Warren, 2007). However, other barriers to digital participation result from the geography of digital telecommunications infrastructure: such territorial based barriers are often overlooked as mediating a lack of digital connectivity, especially at national levels.

The aims of this paper are threefold. Firstly, we reflect on the extent of territorial digital divides in England, Scotland and Wales based on our analysis of data published by the UK telecommunications regulator, Ofcom. Secondly we consider the implications of digital exclusion for rural and, particularly, remote rural, areas, illustrated through a series of case vignettes. Thirdly we review the policy context of broadband and mobile internet infrastructure in Britain and offer critical reflections on alternatives to publicly subsidised and industry-delivered fixed broadband infrastructure improvements that could play a role in addressing territorial digital divides.

2. Digital divides, digital exclusion and digital inequalities

Since the early 2000s, digital divides and related topics such as digital exclusion and digital inequalities have received considerable attention from national and international policy communities and from scholars in a wide range of disciplines, including, for example, Human Geography (Malecki, 2003; Riddlesden and Singleton, 2014; Warren, 2007), Media, Communication and Telecommunications (Helsper, 2012; Howard et al., 2010; LaRose et al., 2007;

* Corresponding author.
E-mail addresses: l.philip@abdn.ac.uk (L. Philip), c.cottrill@abdn.ac.uk (C. Cottrill), j.farrington@abdn.ac.uk (J. Farrington), fiona.williams@chester.ac.uk (F. Williams), fiona.ashmore@abdn.ac.uk (F. Ashmore).

Sparks, 2013), Sociology (DiMaggio et al., 2010; Blank and Groselj, 2015; Khatiwada and Pigg, 2010; Nephew Hassani, 2006; Stern and Wellman, 2010; White and Selwyn, 2013) and Public Policy (Prieger, 2013; Skerrat, 2013). However, relatively little of this research has offered explicit rural perspectives on digital challenges. The Organisation for Economic Co-operation and Development (OECD, 2001) offered a useful working description of the term 'digital divide', stating that it "refers to the gap between individuals, households, businesses and geographic areas at different socio-economic levels with regard to both their opportunities to access information and communication technologies (ICTs) and to their use of the internet for a wide variety of activities" (p5). In the same year, DiMaggio et al. (2010) described the *digital divide* as being "inequalities in access to the Internet, extent of use, knowledge of search strategies, quality of technical connections and social support, ability to evaluate the quality of information, and diversity of users" (p310). Over a decade later, Sparks (2013, p28) noted that the digital divide is a term "used to cover a broad range of social differences in access to and use of digital equipment and services, most notably personal computers, and the ability to access the internet in terms of both physical connection and facility of use". These definitions allude to two broad, interrelated digital divides: (i) socio-economic digital divides and (ii) divides resulting from inequalities in the technological infrastructure required to support digital connectivity.

2.1. Socio-economic digital divides

Research that pays attention to relationships between socio-economic factors and digital divides falls into two broad categories that, at least in part, reflect the impact of Internet diffusion over the past three decades. One category, described by Blank and Groselj (2015, p2763) as studies of a "first level digital divide", has focused upon who is online/offline or who is a digital have/have not and how this has changed over time. In essence, this work is concerned with who does and does not have access to computers and to the Internet. Internet use/non-use has been shown, at the level of the individual, to reflect differences in education, ICT skills, attitudes (notably whether or not an individual thinks the Internet is of use or of interest to them), financial circumstances, social capital, and age. The second category is, according to White and Selwyn (2013, p2), a "more sophisticated" understanding of socio-economic digital divides that has emerged out of research conducted since the early 2000s, research that has cemented a recognition that "the crude notion of 'the digital divide' is better understood as a set of digital divides or inequalities … or as a spectrum or continuum of difference" (*ibid.*). In part this more nuanced understanding reflects the efforts of researchers to keep up with the very fast pace of change in the digital landscape. Early research about Internet use was predicated on users accessing the Internet via a fixed Internet connection in the home or in a public place such as a library via a personal computer. Now the Internet can be accessed in many ways, including via fixed, mobile, public and private connections, from multiple locations and by using different types of Internet enabled devices. Developments such as Wi-Fi connections, 3G and 4G mobile Internet networks and the proliferation and ownership of multiple devices such as laptops, tablets, smart phones and other Internet enabled devices which facilitate Internet connectivity on the move introduce greater complexity into discussions about Internet use and digital divides. A more sophisticated understanding of digital divides encompasses a move towards exploring who is able (or not) to make use of the many potential benefits the Internet offers. Blank and Groselj (2015) suggest that this represents a shift of focus from digital divides to digital inequalities and identify four themes that illustrate

this shift: (i) digital skills/literacy; (ii) the autonomy of users in accessing the Internet; (iii) the social support available to those who want to use the Internet; (iv) and the extent to which individuals are integrated into the prevailing 'techno-culture'. Interestingly Blank and Groselj position digital inequality as being associated with individuals and their socio-economic circumstances: mention is not made of the influence of digital infrastructure provision and availability on digital behaviour.

2.2. Digital infrastructure and digital divides

Internet adoption and use by individuals, households and businesses is contingent on the availability of a telecommunications infrastructure delivered and maintained via the public and/or private sector. Reflections on the digital divide must therefore be cognisant of the digital infrastructure environment that influences how a user gains access to the Internet. The extent, type, reliability and quality of digital infrastructure varies at global, national and sub-national levels and these variations have a profound effect on the ability of Internet users, or those who would like to become Internet users, to be digitally connected and their corresponding online experiences.

Warren (2007, p375) defined *digital exclusion* as a situation where " … a discrete sector of the population suffers significant and possibility indefinite lags in its adoption of ICT through circumstances beyond its immediate control". One such type of digital exclusion is territorial and reflects variations in the availability and quality of telecommunications infrastructure at different spatial scales. An urban-rural digital divide across many countries in the Global North has been acknowledged for some time in academic and policy circles. In 2001 the OECD identified, at the international level, an urban-rural digital divide that was framed by cost and quality of access and related network costs and infrastructure capabilities. Research conducted in North America (e.g. Howard et al., 2010; Carson, 2013; Stenberg et al., 2009; Malecki, 2003), Australasia (e.g. Black and Atkinson, 2007; New Zealand Department of Internal Affairs, 2011) and Europe, including the UK (e.g. Johnson et al., 2012; Peters et al., 2013), reports attempts to improve digital telecommunications infrastructure in remote rural communities but also illustrates the stubborn nature of rural digital exclusion. A common finding is that the rural telecommunications infrastructure is inferior to that serving urban areas. This results in large numbers of people being unable to fully exploit the potential of ICTs because of where they live and work: yet there is a paucity of literature about the specific spatial nature of rural digital exclusion and the ramifications of this.

Improvements to the fixed telecommunications infrastructure, in particular the roll out of superfast and fibre broadband networks and 3G and 4G mobile Internet coverage, have been spatially uneven. In many countries, the UK included, most urban telecommunications networks, along with those serving other areas with reasonably high population densities have been improved. However, more sparsely populated and rural areas commonly lag behind. A small minority of rural residents and businesses in the UK cannot secure a fixed Internet connection. Others can only obtain a slow, unreliable fixed connection. With the gap between Internet users and non-users having contracted in recent years, concerns about digital exclusion, in a rural context or otherwise, are as likely now to arise from the challenges of broadband infrastructure that is unfit for purpose as they are to be concerned with inequalities arising from potential users, by choice or otherwise, not being able to access a service at all.